which also is the volume of the air associated with it. Now the volume V of i Ib. air at 1-06 lb. per square inch pressure and 100° F. is:

$$V = \frac{g\,l\,\hat{}}{I\text{-}06 \times 144} = 19,_{c}\text{. ft.}$$

Therefore the weight of air associated with i lb. steam under these conditions is — = i -70 lb , and the ratio of the weight of air to the weight of steam is thus 1*79.

At the inlet to the condenser, however, the ratio of the air to the steam is extremely small, and assuming that the pressure there is also *2* lb. per square inch absolute, the steam would condense there at 126-2° F. Thus in this case the effect of the air in the condenser is that the steam condenses at the inlet at about 126-2° F., but near the air-pump suction at only 100° F. Had it been possible to exclude all air from the condenser, the temperature of the condensing steam all over the condenser at 2 lb. per square inch absolute would have been 126-2° F. The difference between the temperature of the steam or mixture at the condenser inlet and at the air-pump suction is, therefore, a rough measure of the amount of air entering the condenser. As is shown by the calculations on p. 237, however, the cooling and " devaporizing " of the air has an important influence on the capacity of the air-pumps.

Types of Condensing Plant. — Steam-condensing plant may be divided into two distinct types: (i) " Jet " condensers, where the steam and condensing water become intermixed, and (2) " surface " condensers, where the steam and cooling water are separated by a metal tube or plate. These may be further subdivided into " counter-current or contra-flow ", where the general flow of the steam is in an opposite direction from that of the water, and " parallel current ", where the flow of the steam and water is in the same direction.

The Jet Condenser. — The jet condenser is a relatively simple structure. In the common form usually adopted in reciprocating engines for mill and workshop driving, the condenser is a cast-iron

chamber into which the steam exhausts, where it meets with the injection water sprayed into the condenser through a perforated pipe or rose. The water then falls to the bottom and is extracted along with the air by the wet air-pump driven directly by the engine. In fig. i is shown a jet condenser of the parallel-current type, as made by The Mirrlees Watson Co., Ltd., principally for use with steam turbines, the rotary air and water extraction pumps being independently driven. The exhaust steam from the turbine enters at the top, and the injection water enters directly beneath, issuing through a series of nozzles at high velocity in the form of spray, and thoroughly mixing with the steam. The mixed steam and water then pass through the cone, where the greater part of the steam is condensed. The cone is intended to allow the velocity energy of the water to compress slightly the air and incondensable